

## PUMP PERFORMANCE TESTING

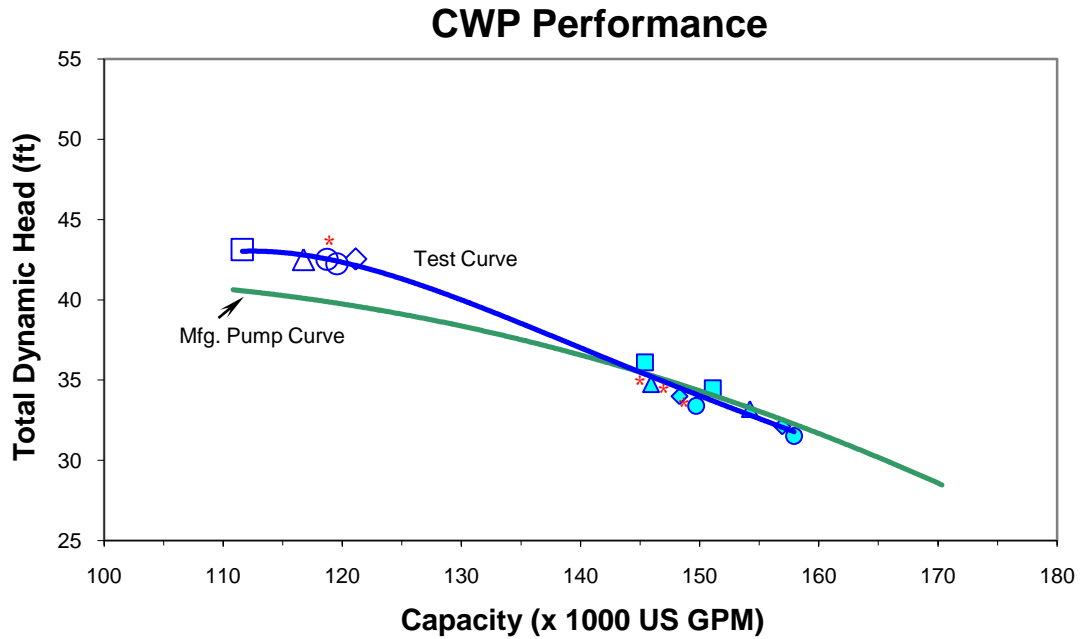


**In the past**, the use of diagnostic flow testing to determine the true operating performance of cooling water and service water pumps was an integral part in achieving optimal plant performance. The results of these tests allowed utilities to improve maintenance planning, reduce the number and duration of unscheduled outages, increase system reliability, and extend the life expectancy of pumping systems.

**Today**, pump performance testing has taken on a new role, one of quantifying potential impacts due to the impingement and entrainment of aquatic organisms. In an atmosphere of increasing regulatory costs and permitting fees associated with water usage, optimistic estimates of pump performance, based on decades-old manufacturer pump curves, are not only inaccurate, they can also be costly. Regulatory expenses should be based on actual flow rates and water usage and dye dilution flow testing can provide an accurate evaluation of pump performance.

Dye dilution flow testing involves the injection of a precise quantity of Rhodamine WT dye into the cooling or service water flow stream. A continuous sample from a downstream location is channeled through a fluorometer where dye concentrations are recorded and compared to calibration standards. The flow rate is calculated using a mass balance equation with immediate flow measurement results. Testing is rapid and most full flow determinations can be made during normal plant operating conditions.

Most circulating water pumps, cooling towers, service water systems and boiler feed pumps are candidates for dye dilution flow testing. Due to the prohibitive cost of rebuilding these pumps and associated unit downtime, dye dilution flow testing provides an alternative to routine pump rebuilding.



By quickly assessing the current working head/flow relationship of each pump, impeller wear, piping losses, surface roughness and elevation changes are accounted for. Since dye dilution flow testing is conducted with the unit on-line, output from existing flow meters can be referenced to dye flow results, recalibrating the meters to existing conditions. Because dye dilution flow testing is based on the mixed concentrations of the dye and not the velocity of the flow medium, test results are not affected by piping geometry, fluid level, fouling conditions, and velocity due to reductions in piping diameter.

By conducting dye dilution flow tests, engineers and maintenance personnel gain a wide range of information on the condition and performance of their cooling water or service water systems. Accurate flow data provides engineers with the ability to operate at design specifications while targeting deficiencies and trending the performance and longevity of plant equipment. Increasing reliability and maximizing performance are the keys to efficient operation. Dye dilution flow testing has become the industry standard when accurate flow data is required.